Space Weather Forecast

Issued on Monday, 09 January 2023 at 12:37 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Moderate solar activity likely, chance of Strong flares throughout.

Solar Activity: Solar activity has been Moderate with four Moderate-class flares observed in the past 24 hours, most originating from a region which is emerging around the southeast limb. This region is currently difficult to classify as it is not yet fully visible, but is likely to be more complex than we can see at present. However, the largest flare originated from a region in the southwest quadrant. This region is in a good position to produce an Earth-directed Coronal Mass Ejection (CME), but we don't currently have enough imagery to confirm whether this flare produced a CME. This region and another in the southeast are currently the two largest and most complex regions on the visible disc, with both showing magnetic complexity. A new region in the north is still growing, but other regions have remained stable. Apart from the aforementioned flare, no Earth-directed CMEs have been observed in the past 24 hours.

Solar Wind / Geomagnetic Activity: Solar winds have declined to slow levels through the period. Wind speeds were initially slightly elevated around 430 km/s, declining to near 370 km/s. Total Interplanetary Magnetic Field was weak, while the north-south component also varied weakly. Geomagnetic activity was Quiet to Unsettled (Kp 0-3) throughout.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was at background levels with no solar radiation storms occurring.

Four-Day Space Weather Forecast Summary
Solar Activity: Solar activity is likely to be Low to Moderate, with a chance of becoming High from any Strong flares through the forecast period, these most likely from the two largest regions on the disc, or the region that is emerging on the southeast limb.

Solar Wind / Geomagnetic Activity: No Earth directed CMEs are currently expected. Solar wind speeds are now at slow levels, and are expected to remain slow through the rest of Day 1 (09 Jan). The next feature of interest is a coronal hole fast wind, which is likely to arrive on Day 2 (10 Jan). Geomagnetic activity is expected to be mostly Quiet at first, increasing with the fast wind arrival on Day 2 to become Unsettled to Active, with a slight chance of a G1/Minor Storm. Activity then slowly declining through Days 3 and 4 (11-12 Jan).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is likely to remain at background levels. However, there is a risk of an increase should any significant flares occur, giving a slight chance of exceeding the S1/Minor Storm threshold.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	20	5	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	70	70	70	70
Very Active	R3 to R5 X	No	25	25	25	25

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	20	20	20	20
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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